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# REPORTS

TO THE

LOCAL GOVERNMENT BOARD

ON

## PUBLIC HEALTH AND MEDICAL SUBJECTS.

(NEW SERIES, No. 19.)

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Dr. R. Deane Sweeting's Report to the Local  
Government Board on the Sanitary  
Circumstances and Administration of  
the Ramsey Urban District, with especial  
reference to the Prevalence of Scarlatina.

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1909

*Price Threepence.*



115  
Dr. R. Deane Sweeting's Report to the Local Government Board on the Sanitary Circumstances and Administration of the Ramsey Urban District, with especial reference to the Prevalence of Scarlatina.

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ARTHUR NEWSHOLME,  
Medical Officer,  
8th November, 1909.

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This inquiry was ordered by the Board in consequence of questions addressed to the President in the House of Commons in July, 1909, by the Member for the Northern Division of Huntingdonshire, in which the Ramsey Urban District is situated.

The parish of Ramsey, then controlled by a local board, was inspected by the late Dr. Airy in 1875. The following *précis* of his report appears in the Medical Officer's report for that year:—

"Prevalence of zymotic disease, especially of enteric fever. Cottages old and dilapidated, and rendered damp by want of proper eaves-guttering and spouting. Canal rendered offensive by inflow of sewage. Sewers insufficiently provided with ventilation and means of flushing. No regular system of excrement removal. Nuisance from pig-keeping. No hospital accommodation."

In 1906 an inspection of the town of Ramsey was made by the Rural Housing and Sanitation Association, and a report was forwarded to the Board which contained severe strictures on its sanitary state, especially as regards working-class housing accommodation.

In November, 1908, the County Council of Huntingdon forwarded to the Board a report by their consulting medical officer of health, Dr. Wilkinson, on "the prevalence of infectious disease, and "sanitary conditions existing in the Urban District of Ramsey." In this report, dated October, 1908, Dr. Wilkinson described in detail a considerable prevalence of scarlatina during the first eight months of 1908, the continuance of which he ascribed to—

- (1) The absence of any means of hospital isolation.
  - (2) The incomplete isolation of the patients in their homes.
  - (3) The neglect of proper disinfection of clothing, &c.
  - (4) Other secondary causes, including attendance at school of contacts and of recovered patients in inadequately disinfected clothes; and predisposition to infectious disease by insanitary vaults and ashpits in confined yards.
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Dr. Wilkinson also animadverted on faulty housing conditions and overcrowding; improper sewerage and sewage disposal; defective excrement and refuse disposal; and water supplies exposed to danger of pollution.

For a description of Ramsey town Dr. Airy's report may be quoted, there having been little or no alteration since 1875:—

"The gravelly promontory on which the town stands is divided by a shallow depression, the natural bed of a small brook (called the Bury Brook from the neighbouring village of Bury in the St. Ives Union) which passes through the town in two culverts in a northerly direction. Immediately below the town the brook becomes a navigable fen-canal (called Bill Lode) which joins the old river Nen on its way to March, Wisbeach and the Wash, giving water-communication with the Cambridge, Norfolk and Lincolnshire fens. A road from Huntingdon crosses the Bury Brook at right angles at Ramsey. The general plan of the town is determined by the directions of the road and the brook, and is accordingly T-shaped, the top bar of the T representing the road from Huntingdon (High Street), and the stalk of the T the covered river with roadway above it (the Great White) leading to the railway station and the wharf at the head of Bill Lode."

The outlying fen country comprises several aggregations of population, chiefly at St. Mary's, as well as isolated farms and cottages. This part of the district is traversed by "droves" and intersected by "dykes."

The urban district has an area of 17,033 acres. The number of inhabited houses and of population has remained practically stationary during the last 30 years, the number of inhabited houses having been 1,027 in 1871 and 1,101 in 1901, and the population 4,734 in 1871 and 4,823 in 1901.

The area is now somewhat greater than in 1871 and 1881, by inclusion of some 837 acres from the Huntingdon Rural District. The number of inhabited houses had increased by only 74 in 1871-1901; they are now estimated at 1,200, there having been, of recent years, some building activity on the outskirts of the town. The population had increased only 89 in 1871-1901; it is now estimated at 4,900, of which about 2,600 belong to the town proper, the rest to the fen country.

The rateable value is £34,276, the annual assessable value £14,471. A penny rate produces £59, £20 of which falls on the town. The general district rate is 1s. 11d., the poor rate 3s. 10d., a total of 5s. 9d. in the £. There is no outstanding debt whatever.

The town proper of Ramsey is placed upon drift-gravel overlying Oxford clay of considerable thickness, with Kelloway rock at its base. The soil of the fen country outside the town is made up of peat or bog earth.

The predominating pursuit of the inhabitants is agriculture, there being as well a few small industries in the town.

*Sanitary Circumstances.*—Though there has been some improvement in minor matters since Dr. Airy's visit in 1875, his chief recommendations, viz., ventilation and flushing of the sewers; abatement of nuisance from polluted and stagnant water in the "basin"; emptying of privies at frequent and regular intervals;

obtaining of good water for the town, and securing the "ballast pit" against pollution, have remained unacted upon.

Dr. Wilkinson's more recent report of 1908 gives a full description of the conditions existing at that time. I am able to corroborate its accuracy entirely.

To briefly recapitulate these conditions. First, as to *housing*, the report of the Rural Housing and Sanitation Association of 1906 is substantially correct as regards certain properties in the town, viz., George Hotel Yard, Ridgley's Row, Gladstone Row, Denham's Yard. Thus, at these and other parts of the district, there are cottages below ground level, dilapidated, with defective roofs, damp walls and floors. Some houses are back to back, others without through ventilation, many are overcrowded, and a few are without proper means of separating the sexes. Many back yards are very foul, and a large number of them are unpaved or badly paved. Fowls are kept in many back yards so as to be a nuisance. No closing orders have been made in the last five years; but three houses have been closed voluntarily and five made fit for human habitation, all in 1907. Several notices to abate overcrowding have been recently served. Next, as to *water-supply*. The "ballast pit" described by Dr. Airy still forms the chief supply of the town. It virtually contains impounded ditch water, gathered from ground liable to human and animal excremental pollution. There is some gravel filtration of the ditch water at its inlet into the "pit," and also some filtration through coarse and fine gravel and sand (six feet in depth) before the water reaches an adjacent well to which a pump is fixed. This filter is said to be cleaned out twice a year. This "pit" holds 700,000 gallons, and is 10 to 11 feet deep. Its sides and base are unlined. At my visit it was full of vegetable growth, and contained numerous beetles and newts. I append an analysis of this water of January 31st, 1908, showing it to be highly polluted and unfit for drinking purposes. No analyses of other sources of supply in Ramsey were available during my visit. The urban district council have posted a notice on the pump supplying this water, recommending it to be boiled before drinking. It is largely used in the town, being either fetched in pails, or bought from a local hawker.

Besides this source, there are three public and many private pumps in the town, all drawing water from shallow wells sunk in the gravel, the depth of none of which exceeds some 15 feet. Similar notices as to boiling are affixed to these public pumps in the town. The use of water from the private pumps is discouraged; but this cannot be altogether prevented, for I found children using them largely. In the outlying fen country there are four public pumps, which supply dyke water, previously filtered through gravel and sand. The filters are said to be cleansed yearly. Some dyke water is drunk directly, after boiling. Rain water is also collected and used for drinking in some parts of the district; but it is seldom filtered.

As regards *sewerage and drainage*, Dr. Airy's account of this, written in 1875, holds good to-day. The Bury brook is still culverted in the Great Whyte, receiving surface water; and there



are still two culverts on each side of it, receiving sewage from part of the town, including now the contents of 41 water-closets along the Great Whyte. The "basin" at the outlet of these culverts, which empties into the river Nene, is still highly polluted with sewage, and was very foul at my visit. This "basin" is said to be occasionally cleaned out, and it is contemplated to do so shortly again. The side culverts are not in direct communication with the central culvert, and do not get flushed from it except in flood time. There is, indeed, with this exception, total absence of flushing of these sewage culverts. Nor are they ventilated. One of the two branch sewers which join the side culverts has recently been provided with a ventilating shaft. Otherwise there is no means of ventilating or of flushing them. A few of the better class houses drain to cesspools; but, generally, sewage is disposed of in ditches in the town and dykes in the fen country. In some parts, both in the town and the fen, where there is no house drainage at all, slops are thrown directly on to the ground near the houses, or on to garden land.

With respect to *excrement disposal*, pail-closets are now gradually replacing privy vaults. Thus, whereas at Dr. Wilkinson's visit in September, 1908, there were 219 pail-closets; in June, 1909, these had increased to 257. A few of them are more or less satisfactorily provided with dry earth; the majority are simply metal pails or wooden tubs. The privy vaults still, however, number 225; most of them are dilapidated, unventilated, and offensive.

*Refuse* is disposed of chiefly in open brick ashpits, the contents of most of which are offensive and foul. But these are being gradually replaced by metal ashcans, some of which have covers.

*Scavenging* of the closet pails and of the ashcans is carried out weekly; that of the privy vaults and ashpits every three months. I found many of these over-full; the open ashpits especially contained all kinds of animal and vegetable garbage. Many of the back yards, too, were littered with similar objectionable material. Three men and two carts are employed in emptying pails and privies: six men and three carts in emptying ashpits and ashcans.

There are only two *dairies* and *cowsheds*, no milkshops. One of the dairies is also used for a larder. The cowsheds are old-fashioned wooden buildings and not over-clean; but the cows are habitually grazed out, sleeping in the sheds only during the winter. Regulations under the Dairies, Cowsheds, and Milkshops Order were adopted in 1888.

There are only two *slaughter-houses*, all unregistered, though byelaws with respect to them were confirmed in 1874. Their chief fault appears to be bad paving.

Those *bakehouses* that I visited were satisfactory.

There is one *common lodging house* (unregistered); one of its three rooms is deficient in cubic space for the number of beds.

As regards the recent prevalence of infectious disease in the urban district, the following Table I. shows the number of notifications and deaths from scarlatina, erysipelas, diphtheria, and enteric fever in the five years 1904-08.

TABLE I. showing the NUMBER OF NOTIFICATIONS and DEATHS from INFECTIOUS DISEASES in RAMSEY URBAN DISTRICT during the five years 1904-08.

Disease.	1904.		1905.		1906.		1907.		1908.	
	Notifi- cations.	Deaths.	Notifi- cations.	Deaths.	Notifi- cations.	Deaths.	Notifi- cations.	Deaths.	Notifi- cations.	Deaths.
Scarlatina ...	10	—	3	—	21	—	93	3	161	3
Erysipelas ...	1	—	—	—	2	—	1	—	—	—
Diphtheria ...	6	—	4	—	9	—	4	1	1	—
Enteric fever ...	3	—	—	—	3	—	8	1	1	1
Totals ...	20	—	7	—	35	—	106	5	163	4

From this it is seen that the great increase in notifications in 1907 and 1908 has been due chiefly to scarlatina, which, however, showed a lower fatality rate in 1908 than in 1907.

The next Table II. shows the number of notifications month by month in the three years 1906-08 and the first seven months of 1909.

TABLE II. showing the MONTHLY NOTIFICATIONS of SCARLATINA in RAMSEY URBAN DISTRICT during the period January 1st, 1906, to July 31st, 1909.

—			1906.	1907.	1908.	1909.
January ...	...	...	10	4	9	22
February ...	...	...	—	4	14	10
March ...	...	...	—	—	9	4
April ...	...	...	—	5	5	13
May ...	...	...	—	6	21	22
June ...	...	...	—	9	16	31
July ...	...	...	—	32	30	26
August ...	...	...	—	2	6	—
September ...	...	...	3	5	7	—
October ...	...	...	4	4	7	—
November ...	...	...	—	6	24	—
December ...	...	...	4	16	13	—
Totals ...	...	...	21	93	161	—

The third quarter thus contributed more than any other in 1906-08; this is largely due to the considerable number of notifications of scarlatina in July of both 1907 and 1908, referable to assemblages of children at festive gatherings of one and another sort. Of the 128 cases notified in 1909 to the end of July, 7 have already proved fatal: 98 of the cases were under 15 years and 47 between 5 and 10 years of age: 4 of the deaths were between 15 and 30.

128 notifications of scarlatina, in seven months, in a community of 4,900 people, equal to a case-rate of about 44 per 1,000 per

annum, with 7 deaths, must be regarded as constituting an exceptionally severe epidemic at the present day. These 128 cases appeared to be about equally divided between the town proper and the outlying fen localities. So that, for purposes of appraising the conditions of spread of the disease, these may be considered as practically one and the same place.

The total 128 cases occurred in 74 families, of which 44 contributed single cases. The remaining 30 families furnished 84 cases, as follows :—

2 families had 5 cases each					
5	"	"	4	"	"
8	"	"	3	"	"
15	"	"	2	"	"

So that about two-thirds of the total cases belonged to families where more than one was attacked. This gives the key to the explanation of the persistent prevalence of scarlatina in Ramsey, viz.:—sustained personal infection and the absence of hospital isolation. I am able fully to endorse Dr. Wilkinson's conclusions in his 1908 report as to the incompleteness and the futility of the home isolation that has been attempted in the district. It has utterly failed to arrest the prevalence of scarlatina. I could adduce many similar detailed instances to those given by Dr. Wilkinson. Suffice it to say that I found children with peeling hands and ear discharges mixing with others, and no precautions worth the name taken to hinder the spread of infection. During my inspection, indeed, subsequent attacks were taking place in families, where previous sufferers were supposed to be under isolation. And, generally, the occurrence of dropping cases in families, at intervals of a few days or a week or so, showed that personal infectivity was still rampant. Attempted home isolation has, too, led to overcrowding in small cottages, since one bedroom has been commonly reserved for the first sufferer, leading to the rest of the family being crowded together in the other bedrooms.

Not only has scarlatina in Ramsey been more fatal so far in 1909 than in 1908 and 1907, but it has shown exceptionally high fatality in ages between 15 and 30. It is also noteworthy that, in three of the four fatal cases in this age-period, there were pronounced cerebral symptoms with suppression of rash. This appears to indicate that scarlatina is becoming more malignant in Ramsey, and approaching a type of greater virulence for adolescents and adults.

As for the influence of schools in spreading the disease, I have no reason to dispute Dr. Wilkinson's conclusions that in 1908 the "association of children in the schools, especially the Council Schools, has contributed very largely to the continuation of the disease," though I did not find that in 1909 these town schools had been largely instrumental in spreading scarlatina. But I found distinct evidence that the Council School at St. Mary's (outside the town) had been actively concerned in disseminating the disease this year. Thus, first sufferers in families were nearly always attending this school prior to attack, and those who escaped were usually those who did not attend this school. On the recommendation of the medical officer of health, it was closed on July 28th until the end of the summer holidays. It remained closed at my visit.



Of the other schools in the district, the following have been closed for scarlatina, viz. :—In the town, the Council School and the Infants' Endowed School for a fortnight from July 31st, 1907 ; in the fen, the Fortyfoot School from November 23rd, 1908, to January 4th, 1909 ; and the Pondersbridge Schools in December, 1908, for a fortnight.

I visited all these and another school in the district. Though varying greatly in their structural condition and arrangements, I could not say that any of them showed any marked insanitary circumstances sufficient to promote the spread of scarlatina. If they contributed at all to keep up the prevalence of this disease, it was by the mere fact of susceptible children assembling together at them. The most important and largest school is the Council School in Ramsey town, consisting of a mixed and infants' division. The number on the books in the former division had, in the last three months, diminished from 286 to 264, and the average attendance from 257 to 218 ; the percentage of attendance had, therefore, in this period dwindled from 89 to 82. Further, 10 girls and 4 boys were absentees at my visit, as belonging to infected households. Similarly, in the infants' division, 3 girls and 5 boys were away. I was satisfied that great care was being taken at this school by the master and his assistants to exclude any suspicious cases. Not long ago a child was found peeling in the class and sent home. As the holidays were so near, I did not counsel the closing of this school ; but I advised the medical officer of health with respect to the need of caution as regards its re-opening at once after the holidays.

On my suggestion, it was agreed that all the Sunday schools in the district should remain closed during the summer holidays.

Dr. Wilkinson drew attention in his report to the faulty and incomplete methods of disinfection in vogue. Since his visit there has been improvement in this respect. Clothing and bedding are now treated in a Thresh's portable steam disinfector, which is kept in the council's yard, for use in the district when necessary. Formaldehyde spray and sulphur candles are now used for fumigating rooms. During this process, houses are vacated for from four to six hours. These improvements, due to Dr. Wilkinson's advice, have, however, been in force only since the spring of this year, so that it is difficult at present to decide whether they have had any effect in retarding the spread of scarlatina.

Pamphlets, giving instructions for dealing with cases of scarlatina, are also left at infected households by the inspector of nuisances ; but they are of doubtful utility, in the absence of and as substitutes for hospital isolation.

Dr. Wilkinson emphasised the necessity of providing hospital accommodation, and advised as well a temporary tent or hired house for quarantining contacts. No steps at all have been taken in the latter respect. A brick hospital is, however, in course of erection in a suitable locality close to the town, after plans drawn up by the inspector of nuisances. No architect has been consulted. It is to be paid for out of current rates, the cost being £50 for the site of half an acre, and £530 for a hospital of twelve beds in two wards.

The plans have not been drawn according to the Board's views. Thus, 1,200 cubic feet per bed only are allowed; there is accommodation for only one disease at a time; the administrative rooms, consisting of a sitting-room, two bedrooms, and a kitchen, are under the same roof as the hospital; no laundry is at present provided.

At my visit, the foundations of this hospital had been laid; so far, it appears to be well and substantially built. An asphalted damp-proof course has been put in: earth-closets are to be used for excrement: a cemented and ventilated cesspit will receive sewage: a rain-water tank, with a concrete base, cemented sides, and external puddling, holding 2,000 gallons, is to be constructed. If this supply fails, town water (probably from one of the public pumps) will be brought in carts. Incomplete and imperfect as this hospital will be, it will afford useful means for future dealing with scarlatina in Ramsey. Bearing in mind its incompleteness, and in view of the continued present prevalence of the disease, I advised, at my visit, that the urban district council should not wait for its completion, but should forthwith provide a temporary tent on the site for the isolation of as many cases as could be removed from infected households. This advice was at first accepted by the council, who gave orders for the immediate erection of a tent. But, on the builder of the hospital undertaking that it should be ready in five weeks, the council, on August 10th, rescinded their resolution to provide a tent. In the meantime, the disease continues to prevail, and there had been seven fresh notifications up to August 18th.\*

*Sanitary Administration.*—Ramsey Urban District Council consists of 12 members, who meet monthly. *Mr. R. F. Serjeant*, Solicitor, is Clerk; *Mr. E. E. Llewellyn*, L.R.C.P., L.R.C.S., L.M. (Edin.), and L.S.A. (Lond.), is Medical Officer of Health at a salary of £40 a year (half repaid by the County). He keeps no journal, but makes monthly reports to the Council. He does not always report to the Board the closure of schools on his advice for infectious diseases, and he did not report to them the serious prevalence of scarlatina, which is still going on. The cares and interests of private practice conflict a good deal with *Mr. Llewellyn's* performance of his public duties. It would be well if this and other sanitary districts in the county could be so combined together as to secure the services of an expert whole time officer.

*Mr. P. S. Bennett* is Surveyor at £40 a year, and Inspector of Nuisances at £60 (the latter salary being half repaid). He has the special certificate of competency in sanitary science given by the Royal Sanitary Institute; but not that of a Sanitary Inspector. *Mr. Bennett* has not previously held the post of an Inspector of Nuisances, and has been in office only since 1907. Before coming to Ramsey, he was assistant to the Urban District Council's surveyor at Ashford, in Kent. Originally he was trained in an architect's office. His journal is well kept, and he is steadily acquiring a good knowledge of his duties. *Dr. Wilkinson's* visit

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\* I have since learnt that during the whole of August there were 12 notifications, 9 in houses previously invaded this year. During September there were 3 notifications. The hospital was opened on September 27th.

has been useful to him in this respect. If any criticism were to be made upon his present work, it is that more active supervision on his part is required of the scavenging of the privy vaults and ashpits in the district.

The only Adoptive Acts in force are the Infectious Disease (Prevention) Act, 1890, and Part III. of the Public Health Acts (Amendment) Act, 1890. Byelaws with respect to Cleansing, Nuisances, and New Streets and Buildings were confirmed in 1873; with respect to Common Lodging Houses and Slaughter-houses in 1874. These respective byelaws are not on the Board's Model, and should be replaced by more modern series.

Within the last two years there have been three prosecutions, under section 126 of the Public Health Act, 1875, for wilful exposure whilst infective, one in August, 1908, the others in July, 1909. The former was dismissed; in the latter two cases the defendants were fined 13s. and 7s. costs, or 14 days' imprisonment. Up to now the fines have not been paid.

There are no certified midwives at Ramsey, the nearest being at Upwood, five miles distant. Dr. Cross of St. Neot's is responsible to the County Council for the supervision of midwives.

On a review of the facts set out above, it cannot be said that the scarlatina prevailing in Ramsey is directly due to the insanitary conditions prevailing there. A sounder view would appear to be that these conditions have had a predisposing influence to this fever, by lowering the bodily resistance to it. There can be no doubt, however, that the imperfect sanitary administration of the district, especially in reference to the failure to provide hospital isolation for cases of scarlatina, has had much concern in the excessive prevalence of the disease.

The foremost and most urgent need for Ramsey is a safe public water supply. Enough has been said to show that all the present sources are open to serious objection, especially in the town. It is not so easy to suggest a remedy. The urban district council have certainly considered the matter of water supply, though not in recent years. Thus, Mr. Gaskins, M.I.C.E., of Liverpool, reported in 1897 as to "improving the present supply," and made certain recommendations, which were to some extent carried out. In his report he speaks of the present supplies as "doubtful and suspicious." And in 1898 Mr. Folkes, engineer, recommended boring for water at Holme, a project which fell through on a question of indemnity against diversion of water by boring operations. This project has not been revived. Previous to these reports there had been, in the year 1886, some boring for water in the town, costing the council some £242. Water was found below the Oxford clay at a depth of some 280 feet, but was considered to be too brackish for use.\*

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\* Professor Kendall, of Leeds, has kindly referred me to an account of a section of boring at Crowland, on pp. 85 and 86 of the Geological Survey Memoir on "the water supply of Lincolnshire from underground sources," which he states is in the same geological position as Ramsey. Here, there was a yield of 15,000 gallons a day at 280 feet, and an additional 5,000 gallons at 470 feet. Both waters were very saline.



It is imperative that the question of obtaining a good local supply of water should be again submitted without delay to an expert water engineer, who should decide whether this can be obtained by boring. Failing that, he might consider the course which was suggested during my inspection of impounding in a reservoir and filtering the water of the Bury Brook above Ramsey ; or of similar treatment of any spring or upland surface water that might be found available in the neighbourhood of Ramsey. As alternatives to any local supply, the piping to Ramsey of water either from the Wisbech Water Company or the Peterborough public supply at a convenient spot might be considered, and negotiations set on foot with the controllers of these supplies. Of course, any of these plans will cost money, more especially the last alternatives. But the question is urgent and paramount ; and it should be remembered that the sanitary indebtedness of Ramsey is at present *nil* (see p. 2). Further, the urban district is not heavily rated, and has a good assessable value. It might be pointed out, too, that, under section 211 (4) of the Public Health Act, 1875, the cost of a water undertaking could be separately assessed for the town proper.

Next in order of importance is the provision of proper sewerage and sewage disposal for the town of Ramsey, though this may wait until a public water supply has been provided. The necessity for this has been abundantly shown in the foregoing statement, based on the reports of Dr. Airy and Dr. Wilkinson, and corroborated by myself. Reports on this subject were presented to the council in 1871 and 1885 by Mr. Hutchinson, the County Surveyor of Huntingdon. He advised, in the latter report, chemical treatment after filtration, with discharge of the effluent to a fen dyke. His suggestions have never been seriously considered. Section 211 (4) of the Public Health Act, 1875, would also apply here.

As for other sanitary requirements, houses unfit for human habitation should receive active attention.

Vault-prives should be replaced by pail closets, pending the establishment of proper sewerage and the more general adoption of water carriage of excrement. The use of dry earth for the pails should be more encouraged. Scavenging of the present vaults and ashpits needs to be better supervised, and undertaken at shorter intervals than three months. The substitution of covered ashcans for open ashpits should continue to be pressed.

All slaughter-houses and common lodging houses should be registered.

Fresh series of byelaws, based on the Board's models, replacing the present codes, should be submitted for the Board's confirmation.

I had the advantage during my inquiry of conferring with Mr. Maule, the Clerk to the Huntingdon County Council, and with Dr. Wilkinson, their Consulting Medical Officer of Health, to whom, as well as to the officers of the Ramsey Urban District Council, I tender my thanks for their assistance in obtaining the facts necessary for this report.

R. DEANE SWEETING.



## APPENDIX.

J. WEST KNIGHTS, F.I.C., F.C.S., &c.,  
*Public Analyst for*  
*Cams, Hunts, Isle of Ely, Cambridge,*  
*and King's Lynn.*

The Laboratory,  
 67, Tenison Road,  
 Cambridge.

## CERTIFICATE OF WATER ANALYSIS.

Sample received from Dr. Llewellyn, Ramsey. Date, January 31st, 1908. Marked "Ballast Pit." No. 15,971/57.

<i>The Sample contained—</i>	Grains per Gallon.
Total solid matter ... ..	51.00
Chlorine ... ..	4.30
Equal to Chloride of Sodium (Common Salt) ...	7.08
Nitrates (Expressed as Nitrogen) ... ..	none
Ammonia (Free) ... ..	.0049
„ (Albuminoid) ... ..	.0140
Oxygen absorbed by organic matter in 15 minutes at 140° F. ... ..	.1428
Appearance in 2 foot Tube—Very deep yellow, slightly turbid.	
Smell when heated to 100° F.—Objectionable.	
Metals—None.	

*Microscopic Examination*—A very slight deposit of organic matter.

*Remarks—*

Total solid matter and chlorides are fairly low.

Free and Albuminoid Ammonia and Oxygen absorbed are all very high, and show the presence of much organic matter.

I consider the water is polluted with organic matter and is unfit for drinking purposes.

J. WEST KNIGHTS,  
*Public Analyst.*

February 3rd, 1908.





